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HAIR DRYER
[Heya doraiya]

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TITLE	(54):	HAIR DRYER
FOREIGN TITLE	[54A]:	Heya doraiya

SPECIFICATION /1*

1. Name of this invention

Hair dryer

2. Claim(s)

[1] A hair dryer comprising a blower 3 containing a fan 7 for blowing air and a motor 8, a graspable blower barrel 4 for sending out the airflow generated by the blower 3 and containing a heater 9, and a handle 5 projecting from the blower 3 in the direction crossing the blower barrel 4; wherein the hair dryer comprises:

a main control switch 28 for controlling the operating states of the motor 8 and the heater 9 and for switching the fundamental operation modes in sequence,

plural sorts of auxiliary switches 29, 45 having different control contents for switching among the basic operation modes or switching the modes to an operating state different from the basic operation modes,

a changeover thumbscrew 30 provided to said handle 5 for the main control switch 28, and

operation buttons 46, 47 provided to said blower barrel 4 for operating the switching of the respective auxiliary switches 29, 45.

3. Detailed Explanation of this Invention

[Industrial Field]

* Numbers in the margin indicate pagination in the foreign text.

This invention pertains to hair dryers and more particularly to a hair dryer having an improved switching operation means for controlling a heater and a motor for blowing air.

[Prior Art]

Hair dryers are generally designed such that one piece of the main control switch on the handle of the hair dryer is operated for sequentially switching the basic operational modes, such as cold airflow, mid-temperature airflow, and hot airflow.

As disclosed by JP-A (Tokkai) S62-246319 and JP-U (Jikkai) H1-11103, for example, there is known a method which installs a single kind of auxiliary switch separately from the abovementioned main control switch for carrying out the switching operation in order to switch the operation modes, for example, between the high hot airflow state and high cold airflow state, and a method which installs an operation button of an auxiliary switch onto the blower barrel and carries out the switching operation of the single kind of the auxiliary switch while gripping the blower barrel.

[Problems to be Solved by the Invention] /2

In order to control the operation of a hair dryer by switching a single kind of auxiliary switch installed on this type of blower barrel, either a part of basic operation mode is switched or the operation state different from the basic operation mode is obtained. For example, switching between the high hot airflow and low hot airflow is the former case, and setting the dryer to the high cold

airflow state or middle temperature airflow state is the latter case. In either case, except the state prior to switching, there is only one kind of operation state which can be obtained by switching a single type of auxiliary switch installed on the blower barrel. For this reason, when performing subtle hair styling and curling, it is difficult to sufficiently obtain necessary operation states using a single kind of auxiliary switch.

Therefore, the conventional hair dryer has disadvantages of limited operation states provided by switching a single kind of auxiliary switch, insufficient operability for processing hair while the blower barrel is grasped, etc. Especially, barbers and hair salons performing highly skilled work for processing hair desire hair dryers equipped with operation modes providing wider variation and subtle differences.

This invention was proposed in view of the abovementioned situations, and therefore has a purpose of realizing a wide variety of operation states and providing more user-friendly hair dryers by improving the operability when switching the operation states.

[Means to Solve the Problems]

This invention provides a hair dryer comprising a blower 3 containing a fan 7 for blowing air and a motor 8, a graspable blower barrel 4 for sending out the airflow generated by the blower 3 and containing a heater 9, and a handle 5 projecting from the blower 3 in the direction crossing the blower barrel 4; wherein the hair dryer

comprises a main control switch 28 for controlling the operating states of the motor 8 and the heater 9 and for switching the fundamental operation modes in sequence, multiple types of auxiliary switches 29, 45 having different control contents for switching among the basic operation modes or switching the modes to an operating state different from the basic operation modes, a changeover thumbscrew 30 provided to said handle 5 for the main control switch 28, and operation buttons 46, 47 provided to said blower barrel 4 for operating the switching of the respective auxiliary switches 29, 45.

[Operation]

Since several kinds of auxiliary switches 29, 45 having different control contents are provided, a wide variety of operation states can be obtained in addition to the basic operation modes by switching each auxiliary switch 29, 45. For example, by providing only two auxiliary switches 29, 45, three sorts of operation states become possible for each basic operation mode.

Moreover, since each of the operation buttons 46, 47 of respective auxiliary switches 29, 45 is disposed in parallel on the blower barrel 4, various kinds of operation states are switched easily and speedily while gripping the blower barrel 4.

[Embodiment]

FIG. 1 to FIG. 9 illustrate one embodiment of a hair dryer related to this invention.

In FIG. 2, the hair dryer comprises a dryer body 1 and

attachments thereof, such as exchangeable nozzle 2 mounted onto a blow outlet 24. A blow part 3 for drawing in external air for supplying with pressure, a blow barrel 4 for laterally blowing the airflow generated by the blow part 3, and a handle projecting downward from the outer face of the blow part 3 are provided to the dryer body.

The dryer body 1 comprises a body case 6 being hollowed throughout its length, blowing fan 7, motor 8, heater 9, and various kinds of electric components which are disposed in the case 6. The body case 6 comprises almost identically shaped right-left divided cases 6a, 6b which are aligned and united with a screw 6c.

In FIG. 4, a fan chamber 12 is formed inside the blow part 3 as a compartment by a circular peripheral wall of the body case 6 and the partition wall 11 continuing to this peripheral wall, and a fan 7 and a motor 8 are arranged therein. The fan 7 consists of a centrifugal multiwing fan which is directly connected to a concentrically arranged output shaft 13 of the motor 8 and driven to revolve around the horizontal axis. The motor is mounted onto the body case 6 via a cylindrical motor case 14.

In order to make vibrations generated by the fan 7 and the motor 8 less transmittable to the body case 6, a vibration absorbent 16 made of rubber is interposed between the mounting seat 15 of the motor case 14 and the screw boss of the body case 6, and the mounting seat 15 is fastened with a screw 17 as shown in FIG. 5. The /3

vibration absorbent 16, shaped into slightly thick metallic washer, is respectively mounted onto three mounting seats 15.

The fan 7 draws in the external air from suction ports 18 opening in the right side wall and left side wall of the fan chamber 12. The outer surface of the suction port 18 is covered by a suction port grill piece 19 made of punching-treated metal. This suction port grill 19 and the open flat face 18a of the suction port 18 are positioned adjacently. In this case, if the suction port grill 19 and the open flat face 18a are arranged almost parallel to each other, the inner part of the fan chamber 12 adversely becomes visible through the punched holes of the suction port grill 19, and also, hair, dust, etc., are easily drawn in. In order to avoid these adverse effects, the right side wall and left side wall of the fan chamber 12 are arranged in such a manner that their center side and peripheral border side are unleveled in the inward and outward directions, and this unleveled part is used as the open flat face 18a of the suction port 18. That is, the suction port 18 is formed such that the open flat face 18a significantly crosses the facial wall of the suction port grill 19.

The blower barrel 4 is formed with a barrel port 21 on the body case 6 side continuing to the peripheral wall of the fan chamber 12 and a nozzle barrel 22 which is insertion-fitted around the protruding end of this barrel opening 21. A heater and a blow port grill 23 irradiating far infrared rays are arranged from the middle

part of the barrel opening 21 toward the tip of the nozzle barrel 22. In the usual manner, the heater 9 is coiled around an insulation plate having a cruciform cross-sectional shape. The blow port grill 23, which is prepared by coating the surface of a lattice-like metallic substrate with far infrared ray radiation paint, is insertion-fixed to the inner end of the blow port 24 of the nozzle barrel 22.

As shown in FIG. 2, in barbers and hair salons, a drier is commonly used by gripping the blower barrel 4 rather than gripping the handle 5. This is because it is easier to use a hair dryer by gripping the blower barrel 4. For this reason, an antislip rib 25 is integrally formed to the lower semi-periphery face of the barrel port 21 and the upper semi-periphery face of the nozzle barrel 22. Moreover, the thickness of the nozzle barrel 22 is gradually increased toward the blow port 24 with reference to the end of the barrel port 21 side in order to prevent the surface from having high temperatures. To explain this in detail, the inner diameter of the nozzle barrel 22 is gradually decreased toward the blow port 24 while the outer diameter of the barrel is gradually increased. This corresponds to the tendency of temperature distribution which is low at the barrel opening 21 side and gradually increases toward the tip of the nozzle barrel 22, wherein the insulation action of the barrel wall is mainly used for decreasing the surface temperature of the nozzle barrel 22.

Although uniformly enlarging the outer diameter of the nozzle barrel 22 can provide almost the same insulation effect in this case, such a method cannot avoid the disadvantages that the blower barrel 4 becomes thicker and hard to grip and it is difficult to move fingers easily and freely while gripping the barrel.

The inside of the handle 5 is separated from the fan chamber 12 by forming a compartment with the partition wall 11 described previously and a compartment wall 27 laterally protruding from the upper end area of partition wall 11, wherein a main control switch 28 extending vertically is provided in this compartment while a second auxiliary switch 29 is provided above the main control switch 28. Moreover, a changeover thumbscrew 30 for operating the main control switch 28 is supported in a manner so as to slide vertically on the outside front face of the handle 5. The changeover thumbscrew 30 changes over the main control switch 28 through a connection plate 31 formed inside of the handle 5.

As shown in FIG. 2 and FIG. 3, the changeover thumbscrew 30 has a U-shaped cross-section to match the shape of periphery face of the handle 5. In the same manner, a finger-placing rib 32 protrudes along the periphery face of the changeover thumbscrew 30, forming a U-shaped cross section, and the protruding length is arranged slightly longer. By forming the finger-placing rib 32 in this manner, the changeover thumbscrew 30 can be operated from any part of the frontal semi-perimeter face of the handle 5.

In FIG. 4, a power cord 33 is guided into the inside of handle 5 through a cord protector 34 being fixed and sandwiched at the lower end of the handle 5, and connected to said main control switch 28. The cord protector 34 is configured of a drum-shaped coil spring and an end part forming an integral hook ring 35 by bending in order to /4 be hooked on a wall or the like. When a power cord 33 is shorted inside or near the cord protector 34, the user could be electrocuted through the cord protector 34. In order to prevent this, a clear protection tube 36 covers the power cord 33 along the passage of cord 34 as well as the front and back sections of the passage.

As described above, when the power cord 33 is shorted, the body case 6 must be disassembled for reconnecting the cord 33. This repairing task, however, results in disassembling the entire body of the body case 6, thereby requiring laborious disassembling and reassembling tasks. In order to eliminate such an inconvenience, as shown in FIG. 5, a repair port 37 is formed by eliminating over half of the lower side of the handle part of the divided case which is the right side in the figure, and a separate cover 38 having the same shape as the shape of the eliminated area is used as an openable-closable cover for the opening 37. The cover 38 is fixed to the opposing divided case 6b by a screw 39 and is removable from the handle 5 by simply pulling out the screw 39.

In FIG. 4, a switch compartment chamber 41 is formed at the position which is in the upper face of the blower barrel 4 and also

abutted to the blow part 3. The switch compartment chamber 41 is compartmentalized by a switch panel 42 being fixed and sandwiched between the divided cases 6a, 6b and an opposing compartment wall 43 protruding from both divided cases 6a, 6b, and the inside of this chamber is divided into front and rear chambers by a vertical wall 44 disposed onto the inner face of the switch panel 42. A first auxiliary switch 45 and an operational button 47 for operating the switch are disposed in the frontal compartment chamber, whereas an operational button 46 for switching a second auxiliary switch 29 and a return spring 48 are disposed in the rear compartment chamber. That is, two operational buttons 46, 47 are arranged in parallel, being exposed from the switch panel 42.

In order to carry out the switching operation of the second auxiliary switch 29 disposed inside of the handle 5, a vertically elongated operation rod 49 is fixed in the lower part of the operation button 46. The operation rod 49 crosses near the outlet of the fan chamber 12, allowing the lower end thereof to be close to the switch piece 29a of the second auxiliary switch 29. In order to determine the position of the operation rod 49 and also to guide the vertical movements thereof, respective guide grooves 50 are formed in the protruding ends of the partition wall 11 and the compartment wall 27. The reference numeral 51 denotes a return spring.

In FIG. 6 and FIG. 7, the operation button 47 for the first auxiliary switch 45 has an oblong base part 53, and a spring arm 54

is provided in the condition protruding from the center of one side of this base part 53 while a locking claw 55 is provided in the condition protruding from the center of the other side. Furthermore, a fulcrum point rib 56 and a cam piece 57 for pushing in the switch piece 45a of the first auxiliary switch 45 are provided on the lower face of the base part 53 in the protruding conditions. A fulcrum point boss 58 is provided in the condition protruding from the upper face of the protruding end of the spring arm 53. Moreover, a button 59 is partly exposed from the center of the upper face of the base part 53.

In the inner face of the switch panel 42, a fulcrum point hole 61, being arranged to correspond to the fulcrum point boss 58, is provided in the recessed condition adjacent to the base end of the vertical wall 44 in the depressed state. Furthermore, a projection 62 is formed on the front-end side of the inner face in order to maintain the ON posture of said operation button 47.

The operation button 47 is installed from the inner side of the switch panel 42, and the fulcrum point boss 58 thereof is fitted in the fulcrum point hole 61. In this condition, the fulcrum point rib 56 comes into contact with the upper face of the first auxiliary switch 45. Moreover, as shown in FIG. 7, the locking claw 55 is abutted to the end of one side of projection 62 while the cam piece 57 faces closely against the switch piece 45a.

The operation button 47, which can be operated to protrude at a

slant or draw in using the fulcrum point rib 56 as a fulcrum point, and when the operation button 47 is pushed in, its cam piece 57 switches the first auxiliary switch 45 to the ON state through the switch piece 45a. When the operational force is released in this state, the operation button 47 returns to the wait state by the elastic force of the spring arm 54, allowing said switch 45 to return to the OFF state.

When the operation button 47, which is also capable of swinging horizontally centering around the fulcrum point boss 58, is operated to swing in the clockwise direction while the operation button 47 remains in the depressed state, the locking claw 55 at the tip enters into the lower face of projection 62 and is supported in the received state, continuously maintaining the ON state of the operation button 47. That is, the operation button 47 in the wait position can turn on and off the first auxiliary switch 45 and is capable of providing self-maintained ON state by being slid in the horizontal direction from the ON position.

The operation buttons 46, 47, which are arranged in parallel /5 to each other, have mutually different surface shapes so that they can be discriminated by simply touching. To explain in detail, as shown in FIG. 7, a discrimination projection 64 having a width slightly wider in the horizontal direction is formed in the center of the outer face of the operation button 46 for the second auxiliary switch, while a discrimination projection 65 consisting of inner and

outer double circular ribs is formed on the outer face of the operation button 47 for the first auxiliary switch 45. Moreover, the projection height of the former discrimination projection 64 is arranged greater than that of the latter discrimination projection 65.

The electric components, such as motor 8, heater 9, main control switch 28, and first and second auxiliary switches 29, 45 which are assembled in the drier body 1, are connected with each other through a wire as shown in FIG. 8.

The main control switch 28 having 5 pieces [(1) to (5)] of the connection terminals sequentially switches the operation state into three kinds of basic operation modes (cold air, low hot air, high hot air) by switching the connection between each of the terminals (2), (3), (4) using the terminals (1), (5) as the power source side. The table in FIG. 8 shows the connection state of the terminals in each operation mode.

The motor 8 is driven by DC current supplied through a rectification circuit 67. One side of the input path 70 of rectification circuit 67 has two serially connected motor resistors 68, 69 and a fuse 73 and also is connected directly to the terminal (2) of the main control switch 28 and indirectly to the terminal (3) through a diode 71 allowing the current to flow only in one direction. Moreover, the other input path 72 of the rectification circuit 72 is connected to the terminal (5) of the main control

switch 28.

In said input path 70, the first auxiliary switch 45 is connected in parallel to the motor resistor 68 of the diode side 71. When the first auxiliary switch 45, which is always open, is switched to the ON state, the motor resistor 68 is bypassed to increase the voltage value impressed onto the rectification circuit 67 to increase the revolving count of the motor 8. That is, the first auxiliary switch 45 functions to increase the airflow quantities in the respective states of the basic operation modes.

A heater input path 74 is branched from the area between the fuse 73 and motor resistor 68 of the input path 70, and a thermostat 75, heater 9, and second auxiliary switch 29 are sequentially connected thereto; also, the constantly closed terminal 29 of the second auxiliary switch 29 is connected to the terminal (4) of the main control switch while the constantly open terminal 29c is connected between two motor resistors 68, 69. A display part A, which differentiates the state of the current flowing into the heater 9 and displays the result, is connected in parallel to the heater 9. The display part A connects two emission diodes 76, 77 in parallel in reverse directions and also connects a resistor 78 for controlling the current. Therefore, the transmission state of the current in the heater 9 is differentiated and made displayable by turning off both diodes 76, 77 at the time of the cold air mode (described later), lighting one emission diode 76 at the time of low hot airflow mode,

or lighting the other emission diode 76 at the time of high hot air mode so that it can be displayed. The emission diode 77 may be replaced with a regular rectifier, and installation of this rectifier can limit the voltage at both ends of the emission diode 76 with the sequentially dropping voltage (about 0.6 V) of this rectifier for protecting said emission diode 76.

Next, the following explains each operation states of basic operation modes and also the operation state when the first and second auxiliary switches 29, 45 are switched.

(Cold air mode)

In this state, terminals (2) and (3) are connected to the terminal (1) of main control switch 28, opening the path between terminals (4) and (5). Therefore, the heater 9 does not receive any current, and only the motor 8 is driven for revolution (5,500 rpm).

When the first auxiliary switch 45 is turned on in this state, the current bypasses the motor resistor 68 to reduce the motor resistance for that amount, thereby increasing the value of the voltage impressed to the motor to increase the revolution count of the motor 8, subsequently increasing the amount of airflow (5,500 rpm).

Moreover, when the second auxiliary switch 29 is switched to the terminal 29c side in said cold air state, the circuit in the heater 9 side becomes connected in parallel to the motor resistor 68. That is, the resistance provided by compounding the resistance of the

heater 9 and the motor resistance 68 determines the value of the voltage impressed to the rectification circuit 67. This compounded resistance value is smaller than the value of motor resistance 68 itself. Therefore, although the value of the voltage impressed to /6 the rectification circuit 67 becomes higher to increase the revolution count of the motor 8 compared with that at the time of cold air flow, since the increase amount of the voltage value is less than the voltage when the first auxiliary switch 45 is turned on, the voltage value is then between the value obtained at the time of cold air and the value obtained during the ON state of the first auxiliary switch 45 (< 6,500 rpm).

When both the first and second auxiliary switches 29, 45 are turned on at the same time, the result becomes the same as the case when only the first auxiliary switch 45 is turned on.

(Low hot air mode)

In this condition, terminal (1), terminal (3), and terminals (4) and (5), which are connected to the heater, are connected to supply the drive power to both the motor 8 and heater 9. However, since the circuit connected to the terminal (3) carries out half-wave rectification through the diode 71, only the half-wave part of the commercial DC power is used to lower the value of voltage impressed to the motor 9 below the value of cold air mode, subsequently resulting in decreased revolution speed (4,000 rpm). Moreover, the power consumed by the heater 9 also decreases to lower the heating

temperature (600 W).

When the first auxiliary switch 45 is turned on in the low hot air mode, the motor resistance 68 is bypassed as described above to increase the revolution count of the motor 8, resulting in an increased airflow quantity; however, the increased amount is small (4,500 rpm).

When the second auxiliary switch 290 is turned on in the low hot air mode, since the circuit at the heater 9 side is connected in parallel to the motor resistor 68 as described above, the value of the current supplied to the heater 9 decreases to an almost unnoticeable amount. At the same time, the revolution count of the motor 8 increases (< 4,500 rpm). That is, in this case, since the heater 9 stops generating heat in the low hot air state, the condition is switched to the cold air state having a slightly reduced revolution count compared with that in the cold air mode.

Incidentally, by simply turning off the connection between the terminal (4) and the heater 9 at the time of turning on the secondary auxiliary switch 29, the heater 9 can stop generating the heat. In this case, however, since the value of voltage impressed to the rectification circuit 67 is same as that during the low hot airflow time, the revolution count of the motor 8 maintains almost the same value as that of the low hot air mode and, therefore, the airflow amount cannot be increased.

When both the first and second auxiliary switches 29, 45 are in

the ON state, the revolution count of the motor 8 increases (4,500 rpm) in the same way as when the first auxiliary switch 45 alone is turned on, and the heater 9 hardly generates heat.

(High hot airflow mode)

In this operation mode, terminals (1) and (2), (1) and (3), and (4) and (5) are connected respectively. The difference from the time of low hot air mode is that the entire wave part of the commercial DC power is impressed to make the revolution count of the motor 8 equal to that of the cold airflow mode (5,500 rpm). Moreover, the power consumed by the heater 9 becomes twice the amount of the low hot air mode (1,200 W).

When the first auxiliary switch 45 is turned on in the high hot air mode, the revolution count of the motor 8 increases to also increase the airflow amount (6,500 rpm).

When the second auxiliary switch 29 is switched to the terminal 29c side, the heat generated by the heater 9 decreases to an almost unnoticeable degree while the revolution count of the motor 8 increases at the same time (< 6,500 rpm). That is, in this case, the high hot air state is switched to the cold air state.

When both the first and second auxiliary switches 29, 45 are switched, the motor revolution count becomes equal to that in the state of turning only the first auxiliary switch 45, and the heater 9 is not heated.

The summary of the operations described above is shown in the

table of FIG. 9.

In each state of the basic operation mode as described above, when the first and second auxiliary switches 28, 45 are operated, various kinds of operation states can be obtained. Therefore, the hair dryer can be used in various configurations corresponding to the purpose of the operation; for example, to perform simple drying and blowing, the main control switch 28 is operated to obtain the required operation state by holding the handle 5, or for styling hair, the high hot air state and high cold air state, for example, are alternated by holding the blower barrel 4.

When gripping the blower barrel 4, the gripping posture not requiring overlaid fingers is often selected as shown Fig. 2. /7
In this gripping posture, operation buttons 46, 47 for both auxiliary switches 29, 45 are provided between the gripping positions of the index finger and middle finger, providing a strong operation force. Therefore, each operation button 46, 47 can be easily operated and switched while gripping the blower barrel 4, and furthermore, the operation state can be switched speedily. Since differently shaped discrimination projections 64, 65 are respectively provided for both operation buttons 46, 47, the operation buttons 46, 47 can be discriminated only by feeling with fingers at the time and erroneous operations are also prevented.

(Another embodiment)

In the abovementioned embodiment, the first auxiliary switch 45

functions as an airflow amount increasing switch while the second auxiliary switch 29 functions as a switch for stopping the heater 9 function, increasing the airflow amount at the same time; both switches 29, 45 can be modified respectively in order to provide different functions.

For example, if the second auxiliary switch 29 is placed in the circuit at the terminal (2) side continuing to the input path 70, and the circuit connecting to the terminal (2) is arranged to shut off when this switch 29 is switched to the terminal 29c side, 2 to 4 kinds of airflow variations can be realized for each state of basic operation mode including the conditions changed by the first auxiliary switch. That is, the amount of airflow can be switched between high and low.

Moreover, either the first or second auxiliary switch 29, 45 is arranged to function as an emergency stopping switch or turning-over switch between the basic operation modes.

Needless to say, two or more kinds of auxiliary switches may be used.

As for discriminating both operation buttons 46, 47 based on the tactile sensation, the following means may be employed other than the method of differentiating the shapes of the discrimination protrusions 64, 65.

The operational configuration of both operation buttons 46, 47 are differentiated. For example, both operation buttons 46, 47 are

formed into a push button and a sliding button.

Both operation buttons 46, 47 are positioned by shifting in the circumferential direction while being aligned with the tips of the index finger and middle finger which are gripping the blower barrel 4. When both operation buttons 46, 47 are push buttons and positioned by being shifted in the circumferential direction as described above, the center axes of each of the projecting/recessing operation buttons 46, 47 are preferably arranged to cross toward the center of the blower barrel 4.

The respective operation forces or operation strokes needed for switching each operation buttons 46, 47 are differentiated into large and small forces or strokes.

Moreover, as the interrelation of both operation buttons 46, 47, one button in the operating state may be arranged to lock the operation of the other button, or it is also possible that, when both switches are operated at the same time, only the switch having a higher priority is turned on to force the switching accordingly.

The blowing mechanism of the dryer body 1 does not necessarily require the use of a centrifugal type fan 7. For example, it may be configured to use an axial flow fan for generating the airflow.

[Effect of the Invention]

As explained above, separately from the main control switch 28 which carries out sequential switching of the basic operation modes, this invention provides several kinds of auxiliary switches 29, 45

having different control contents for switching the operations different from the basic operation modes or for switching among the basic operation modes, thereby providing a wide variety of operation states; for example, operation states of the motor 8 and heater 9 can be rapidly or subtly changed, enabling the dryer to be highly reliable for difficult styling techniques. Moreover, since each of the operation buttons 46, 47 for switching these auxiliary switches 29, 45 is arranged in parallel with each other on the blower barrel 4, each auxiliary switch 29, 45 can be switched easily and speedily at the time of styling the hair while the blower barrel 4 is gripped, enabling the dryer to be highly user-friendly.

4. Simple Explanation of the Figures

FIG. 1 to FIG. 9 illustrate one embodiment of the hair dryer based on this invention.

FIG. 1 is an explanatory diagram for explaining the theory.

FIG. 2 is the frontal view.

FIG. 3 is the cross-sectional view of line A-A in FIG. 2.

FIG. 4 is the frontal view showing the inside. /8

FIG. 5 is the cross-sectional view.

FIG. 6 is the frontal view of the cross-section of the switch compartment.

FIG. 7 is the plane view of the switch compartment.

FIG. 8 is the electric schematic illustrating the wiring of the electric parts.

FIG. 9 is the table showing the control condition indicating the operational changes of motor and heater in each operation state.

1...Dryer body; 3...Blow part; 4...Blower barrel; 5...Handle; 7...Fan; 8...Motor; 9...Motor; 28...Main control switch; 29...Second auxiliary switch; 30...Thumbscrew; 45...First auxiliary switch; 46...Operation button; 47...Operation button

FIGURE 1

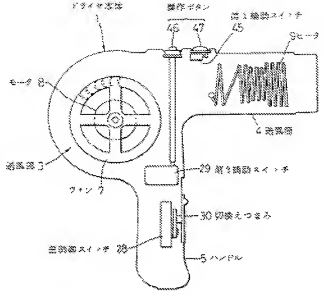


FIGURE 2

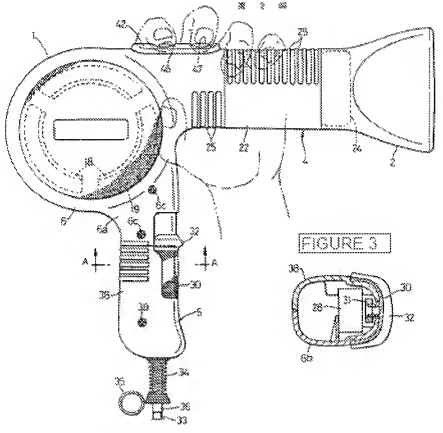


FIGURE 3

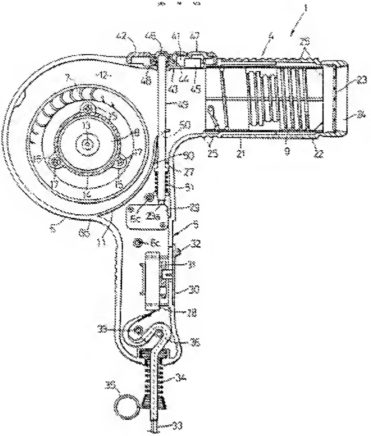


FIGURE 5

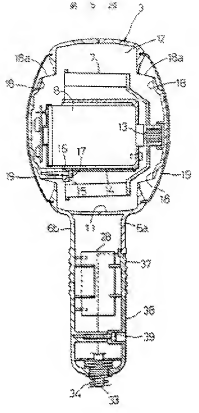


FIGURE 6

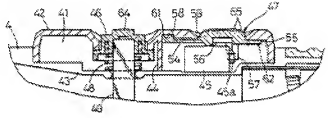


FIGURE 7

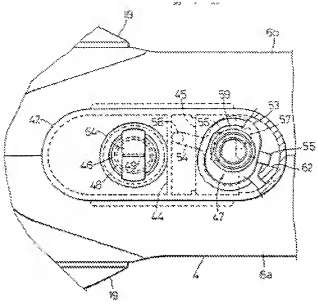
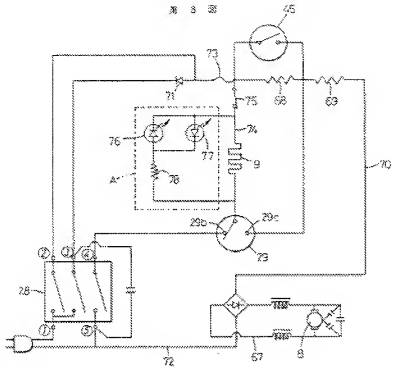
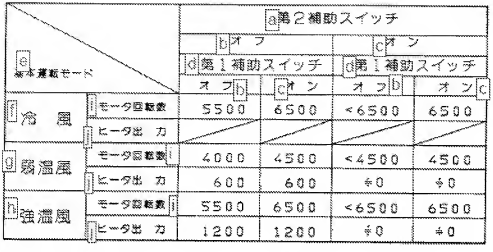


FIGURE 8 /10



	(1)-(2)	(1)-(3)	(4)-(5)
Cold air	ON	ON	OFF
Low hot air	OFF	ON	ON
High hot air	ON	ON	ON

FIGURE 9



e 基本運転モード		a 第2補助スイッチ			
		b オフ		c オン	
		d 第1補助スイッチ		d 第1補助スイッチ	
		オフ b	c オン	オフ b	オン c
f 冷風	モータ回転数	5500	6500	<6500	6500
	ヒータ出力				
g 弱温風	モータ回転数 i	4000	4500	<4500	4500
	ヒータ出力 j	600	600	≒0	≒0
h 強温風	モータ回転数 i	5500	6500	<6500	6500
	ヒータ出力 j	1200	1200	≒0	≒0

(Motor revolution count = n.p.m: heater output = W)

Key: a) Second auxiliary switch; b) OFF; c) ON; d) First auxiliary switch; e) Basic operation mode; f) Cold air; g) Low hot air; h) High hot air; i) Motor revolution count; j) Heater output